

PATENT SPECIFICATION



Application Date: Jan. 25, 1924. No. 2093 / 24.

233,018

Complete Left: Oct. 27, 1924.

Complete Accepted: April 27, 1925.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Apparatus for Discharging Grain and other Material from Railway Wagons.

I, LIONEL COKE HILL, of 54, St. Francois Xavier Street, Montreal, in the Province of Quebec, Dominion of Canada, a British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to apparatus, commonly called car dumpers, for discharging grain or other loose material (hereinafter included in the term grain) from railway wagons or box cars (hereinafter referred to as wagons), having normally closed side openings, and it has for its object to provide apparatus of a simpler, more compact and economical construction than heretofore and whereby grain can be dumped from a wagon in a quicker and better manner than with the car dumpers heretofore used.

For this purpose, apparatus according to the invention comprises a platform or support mounted to rock about a horizontal longitudinal stationary axis and adapted to carry a wagon having a side discharge opening, means for turning the platform about the said axis so as to tilt it towards the discharging side, means mounted upon the platform adapted to centre and firmly hold a wagon endways on the platform and means for imparting a reciprocating motion to the wagon on the platform whilst tilted to one side, so that grain at each end of the wagon can be caused to flow in the direction of and out of the discharge opening of the wagon. Also, means may be provided whereby the movement of the wagon in either direction, or in each direction, at will, can be suddenly arrested so as to impart a jar or vibration to the wagon that will act to dislodge grain more effectively from one or other or both of the two

end portions of the wagon towards the side door opening through which it will be discharged. Arranged at a lower level than the wagon and on the discharging side thereof, are provided means that may be of ordinary kind, for instance a hopper with endless conveyor, for distributing the dumped grain to any desired place. When as is usual, the side door opening in the wagon is closed at the inner side by horizontally arranged boards held in place by nails, by the pressure of the grain within the wagon, or by other means, and on the outside by a sliding door, means are provided at the discharging side of the platform and wagon whereby, after moving the outer door into its open position, the said boards, forming an inner door, will automatically be forced into the wagon by the tilting of the platform and wagon, so as to uncover the door opening and enable the grain to escape.

As will be obvious, apparatus embodying the invention can be constructed in various ways.

The following is a description of one construction from which others can readily be evolved.

The platform or support consists of a built up structure comprising for example longitudinal and transverse members, for instance I beams, and upper and lower cross bracing, the whole forming a rigid structure the lower side of which is adapted to turn upon stationary bearings arranged at the bottom of a longitudinal recess or pit adapted to accommodate the rocking platform or support. Upon the platform are longitudinal wagon supporting rails arranged, when the platform is in its normal position, to register with the rails on the permanent track at each end of the recess

or pit. One side of the platform is provided, it may be near the bottom thereof, with one or more toothed segments with which engage one or more toothed wheels or pinions fixed to a shaft adapted to be rotated by an electric or other motor, so that the platform, with a wagon fixed thereon, can thereby be tilted towards the discharging side of the wagon. The extent of tilting may be limited by an abutment arranged at the bottom of the pit below the adjacent side of the platform. Extending longitudinally and centrally through the platform between its lower and upper sides and carried by suitable bearings, is a shaft upon the end portion of which are mounted devices adapted to embrace a wagon between them so as to centre and firmly clamp the same in position on and to the platform. For this purpose, each centreing and clamping device may be of known kind comprising a carriage mounted to reciprocate in guides carried by the longitudinal side members of the platform and provided with a nut engaging a screw threaded portion of the longitudinal shaft, the carriage being provided with an upward extension, which may be formed of oppositely inclined members carrying a head adapted to engage the corresponding end of a wagon. The extensions are adapted to be collapsed in known way to permit a wagon to be run on to and off the platform. The arrangement is such that after the extensions have been collapsed to permit a wagon to be run on to the platform they are raised so as to come opposite to the ends of the wagon and then upon rotating the shaft, the two carriages will be drawn towards each other by the screws on the shaft and the nuts on the carriages, which are right and left handed, so as thereby to cause their upward extensions first to centre the wagon and then to clamp it firmly in place on the platform through the carriages and shaft.

For reciprocating the wagon on the platform and imparting a jarring or bumping motion thereto alternatively in opposite directions, there is fixed upon the shaft and at a suitable distance apart, two sleeves or collars between which is mounted to slide on the shaft, a slipper which is reciprocated by a pair of eccentric rods and two eccentrics fixed on a transverse shaft driven through reduction gearing from a motor, for example an electric motor fixed to and within the platform structure. The longitudinal space between the collars is of greater length than the slipper. Arranged at the outer sides of the two collars and carried by bearings fixed to the platform structure, are two bumping blocks or abutments through which the shaft extends. The arrangement is such that when the motor is in action it reciprocates the slipper which first acts against the sleeve or collar, say the forward one, and moves the shaft, carriages and wagon longitudinally in one direction, to the extent of its forward motion, after which the shaft, carriages and wagon move forward, by their inertia, to a further extent independently of the slipper until suddenly arrested by the forward collar abutting against its bumping block whereby a jar or shock is imparted in one direction to the wagon. On the slipper making its backward stroke it bears against the rear collar and moves the shaft, carriages and wagon in the reverse direction to the extent of its movement, the shaft, carriages and wagon over-running the slipper until arrested by the rear bumping block which imparts a jar or shock in the reverse direction to the wagon. By the arrangement described, the motor is relieved by shock when the collars abut against their respective bumping blocks.

By the means described, the grain in the tilted wagon will quickly become dislodged from the end portions thereof to the centrally arranged side door opening through which it will quickly flow until only a strip or length thereof remains in the lower corner of the tilted wagon at each side of the door opening. As long as each strip of grain is of sufficient depth to remain in contact with the corresponding end of the wagon, it will continue to flow toward the door opening but as the depth diminishes and the end of the strip leaves the end of the wagon, the rate of discharge decreases as there is nothing to prevent the grain being jolted backward and forward indefinitely by the reciprocation or if each bumping block is used with alternate strokes of the shaft. To avoid this disadvantage and enable the whole of the grain to be rapidly discharged, each bumping block may be so mounted that it can be adjusted longitudinally to a sufficient extent to prevent the adjacent collar on the shaft striking it. For this purpose each bumping block may be screwed into its bearing. By thus adjusting first one bumping block so that it will not be brought into action but only the second one, the wagon will be arrested suddenly only in one direction and gently in the other so that the grain will flow in the direction of the bumping block that is in action. When the grain remaining in the end of the wagon

has thus been discharged, the second bumping block is adjusted endways to put it out of action and the first one is brought into the operative position whereupon the grain remaining in the other end portion of the wagon will be discharged. Means may be provided for quickly effecting the endways adjustment of the bumping blocks into their inoperative and operative positions.

In some cases the construction may be such that a wagon will only be reciprocated and not be subjected to jars or shocks through bumping blocks as described. In this case, the collars on the shaft may be made endways adjustable so as to embrace the slipper between them and the bumping blocks be moved into their inoperative positions. Or the collars, slipper and bumping blocks may be dispensed with and the eccentric rods be jointed to a collar or equivalent device fixed to the shaft.

For forcing the boards, forming the inner door, inward, when the platform and wagon are tilted, there may be employed a device such as a strut pivoted at its lower end to a bearing block fixed to the ground at the side towards which

the platform and wagon are tilted and normally held in its raising and inoperative position by a counterweight which is connected to it by a rope or cable passing over an overhead sheave, so that it can be readily lowered by hand operated or controlled means into an inclined operative position with its free end opposite the door opening so that when the platform and wagon are tilted towards it, it will act to force the inner door inward and thereby uncover the opening and permit the grain to escape.

Arranged in a pit below the strut is a hopper into which the grain is delivered from the wagon and below which is an endless conveyor belt or equivalent means for carrying away the grain and delivering it where required.

The details of construction can obviously be variously modified without departing from the essential features of the invention.

Dated this 25th day of January, 1924.

For the Applicant,
LLOYD WISE & Co.,
10, New Court, Lincoln's Inn, London,
W.C. 2,
Chartered Patent Agents

COMPLETE SPECIFICATION.

Improvements in or relating to Apparatus for Discharging Grain and other Material from Railway Wagons.

I, LIONEL COKE HILL, of 54, St. Francois Xavier Street, Montreal, in the Province of Quebec, Dominion of Canada, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to apparatus, commonly called car dumpers or car unloaders specially suitable for discharging grain or other loose broken up or granular material (hereinafter included in the term loose material) from railway wagons or box cars having normally closed side openings, but adapted also for unloading other types of railway vehicles as for example, coal wagons having fall down side doors, hopper bottom wagons, gondolas and so forth and also other types of vehicles, such as motor cars and motor trucks (all hereinafter included in the term wagons) and it has for its object to provide apparatus of a simpler more compact more robust and more economical construction than heretofore and whereby loose material

can be dumped from a wagon in a quicker and better manner than with the car dumpers or unloaders heretofore used.

For this purpose apparatus according to the invention comprises, broadly, means for imparting a reciprocating, vibrating or shaking motion to a loaded wagon whereby the wagon is moved bodily in an endways or longitudinal direction in such manner that the contents thereof shall be discharged therefrom through the discharge opening therein, in a quick and effective manner. More specifically considered, the apparatus may comprise wagon supporting means, that may be mounted to turn about a horizontal longitudinal axis, means for turning such wagon supporting means, when so mounted, together with a wagon thereon, to one side about the said axis, means mounted upon the wagon supporting means adapted to centre and firmly hold a wagon against undesired endways movement on the wagon supporting means and means for imparting a reciprocating motion to the wagon either whilst the wagon supporting means and wagon are tilted to one

side, or whilst they are upright, so that loose material at each end of the wagon can be caused to flow in the direction of and out of the discharge opening of the wagon. Also, means may be provided whereby the movement of the wagon in either direction, or in each direction, at will, can suddenly be arrested so as to impart a series of bumps or jars to the wagon during the reciprocating motion, that will act to dislodge loose material more effectively from one or other or both of the two end portions of the wagon towards the opening through which it will be discharged. Arranged at a lower level than the wagon and on the discharging side thereof, are provided means that may be of ordinary kind, for instance a hopper with endless conveyor, for distributing the dumped loose material to any desired place. When the wagon is provided with a side door opening closed at the inner side by horizontally arranged boards held in place by nails, or by the pressure of the loose material within the wagon, or by other means, and on the outside by a sliding door, means that may be of known kind, are provided at the discharging side of the platform and wagon whereby, after moving the outer door into its open position, the said boards, forming an inner door, will automatically be forced into the wagon by the tilting of the wagon supporting means and wagon, so as to uncover the door opening and enable the loose material to escape.

As will be obvious, apparatus embodying the invention can be constructed in various ways.

In the accompanying illustrative drawings,

Fig. 1 shows in plan, one construction of apparatus embodying the invention;

Fig. 2 shows the apparatus partly in side elevation and partly in section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical cross-section taken on the line 3—3 of Fig. 4.

Figs. 4 and 4^a are vertical longitudinal sections, Fig. 4^a being a continuation of Fig. 4,

Figs. 5 and 5^a are horizontal sections taken on the lines 5—5 of Fig. 4, and 5^a—5^a of Fig. 4^a, respectively, Fig. 5^a being a continuation of Fig. 5.

Fig. 6 is a vertical section taken on the line 6—6 of Fig. 4^a.

Fig. 7 is a vertical section showing a double eccentric forming a part of the reciprocating mechanism,

Fig. 8 is a similar view to Fig. 7 showing the parts in an altered position, and

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8.

In the example shown in the drawings, 10 indicates in general, a rectangular platform or support comprising primarily two parallel I shaped beams 11, 11, suitably joined together or otherwise braced as by the transverse I-shaped beams 12, here shown as four in number, the whole forming a rigid structure. On it are mounted two parallel rail sections 13, 13, together forming a track adapted to hold a railroad wagon, here shown as a side-door box wagon, and indicated by the reference numeral 14. The track 13, 13 on the platform 10 registers with the permanent tracks 15, 15 at each end of the apparatus when the platform is in its normal horizontal position so that a wagon can be easily run on to or off the platform from either end.

The platform 10 is mounted on four centrally arranged aligned bearings 16, shown as mounted beneath the transverse members 12, and supported on the bottom of a longitudinal pit 17 arranged below the platform. The pit 17 is somewhat widened and deepened at its central portion as indicated by 18 to accommodate the hopper, conveyor, and other mechanism of the device to be hereinafter described more in detail. One side of the platform 10 carries a rotatable longitudinally arranged shaft 19 carrying four pinions 20 engaging with a like number of stationary curved racks 21 (Fig. 6) mounted on the side 17^a of the pit 17. Any suitable means are provided for rotating the shaft 19 and the pinions 20 to cause them to travel on the racks 21 to tilt the platform 10, sideways. As an example of such means, there is shown an electric motor 22 adapted to drive a shaft 23. On the end of the shaft 23 is a worm 24 meshing with a gear wheel 25 (see Figs. 4 and 5). A suitable clutch 26 is provided for locking the worm 24 into engagement with the shaft 23. The gear wheel 25 is mounted on a transverse shaft 27 carrying a worm 28 meshing with a gear wheel 29 (Fig. 3) fixed on the shaft 19. It is obvious that with the clutch 26 in engagement, rotation of the motor 22 will rotate the shaft 19 and pinions 20 to tilt the platform 10 to one side. The extent of tilting may be limited by stops 30 (Fig. 6) arranged at the lower ends of the curved racks 21.

Suitable means are also provided for centering and holding a wagon 14 on the platform 10 against endwise movement. Such means may be of known kind, and the details of the same form *per se* no part of the present invention. For purposes of illustration such centering and holding means may comprise two clamps 31, one at each end of the wagon. These

clamps may be lowered in a well known manner to permit entry and removal of the car. Each of the clamps is mounted on a sliding carriage 33 provided with
 5 four shoes 34 adapted to slide in guides 35 mounted on the longitudinal members 11 of the platform 10. Each carriage carries a block 36 through which is threaded a longitudinally arranged shaft
 10 37 extending substantially the entire length of the apparatus. It is to be noted that the threads in one of the blocks 36 is right hand and in the other left hand, so that rotation of the shaft 37
 15 serves to move the two carriages 33 toward or away from each other. The following means are provided for rotating the shaft 37. Loosely mounted on the shaft 23 of the motor 22 is a pinion
 20 38 meshing with a pinion 39 splined on the shaft 37. A clutch 40 is provided to lock the pinion 38 to the shaft 23. It will be seen that when the clutch 40 is in engagement, the motor 22 can be
 25 used to rotate the shaft 37 to draw the clamps 31 toward each other or separate the same. In operation, the clamps 31 are lowered and separated a sufficient distance. The wagon 14 is then run on to
 30 the platform 10 approximately to the centre thereof. The clamps 31 are then raised, the clutch 40 closed and the motor 22 operated to draw the clamps toward each other to grip and centre the wagon
 35 14. The pitch of the threads in the two blocks 36 makes the clamping mechanism self-locking. As here shown, one motor 22 is designed to perform both the tilting and clamping operations. Two
 40 motors may be used if desired. With the construction shown, the motor 22 may first bring the clamps 31 together, the clutch 40 may then be opened and the clutch 26 closed and the motor used to
 45 tilt the platform. The tilting mechanism passing through the worms 24 and 28 may be made self locking so that the platform will remain in its tilted position.

The construction and operation of the
 50 means used for reciprocating or vibrating the wagon on the platform will now be described in detail. The power to be used for this purpose may be furnished by an electric motor 41 (Figs. 3, 4 and 5)
 55 mounted on the underside of the platform 10 and driving a pinion 41^a meshing with a gear wheel 41^b mounted on a shaft 42. This shaft carries two pinions 43 and 44, the former being relatively smaller.
 60 These two pinions are provided for the purpose of furnishing two speeds of reciprocation from a constant speed motor. Either one or the other of the two pinions 43 and 44 is adapted to be
 65 operatively engaged with the shaft 42 at

one time. This may be accomplished by any suitable clutch arrangement of well known form here shown to a certain extent diagrammatically in Fig. 3 as indicated by 45 and 46, the clutch
 70 member 45 being adapted to lock the pinion 43 to the shaft 42 and the clutch 46 likewise serving to lock the pinion 44 to the said shaft. The pinions 43 and 44 mesh with pinions 47 and 48
 75 respectively, on a shaft 49 (Figs. 4^a and 5^a) likewise mounted on the bottom of the platform 10. The shaft 49 carries a double eccentric mechanism most clearly shown in Figs. 7, 8 and 9. This
 80 double eccentric mechanism comprises an eccentric disc 50 fixed to the shaft. Surrounding the wheel 50 is an eccentric collar 51. Surrounding the collar 51 is an eccentric strap 52 carrying the forked
 85 connecting rod 53 which is pivotally connected to a slipper 54 on the shaft 37. By means of the double eccentric arrangement the stroke of the slipper 54 may be varied by reversing the direction of rota-
 90 tion of the motor 41. The eccentric collar 51 is provided with a recess 55 on its inner surface extending approximately through a distance of 90°. The
 95 eccentric wheel 50 carries a key 56 adapted for movement in the recess 55 but designed to engage either one end or the other of the recess 55 depending upon the direction of rotation of the shaft
 100 49. When the shaft 49 is rotated in the direction indicated by the arrow in Fig. 7, the eccentric collar 51 has one position relative to said shaft, but when the direction of rotation of the shaft is reversed, as indicated by the arrow in
 105 Fig. 8, it will be noted that the key 56 moves the length of the recess 55 permitting the collar 51 to slip back about one quarter of a turn to the position shown in Fig. 8, thus lengthening the
 110 stroke of the slipper 54.

Mounted on the shaft 37 with the slipper 54 between them, are two collars 57 and 58. The collar 57 is held by means of a pin 57^a. This collar has two
 115 adjustments. In the position shown in Fig. 4^a, the collars are far enough apart to permit some motion of the slipper between them. By placing the pin 57^a in another hole 57^b in the shaft 37 it
 120 may be moved up close enough to the slipper so as to take up the lost motion. With the collars separated as shown in Fig. 4^a, the arrangement is such that when the motor 41 operates, the slipper
 125 54 reciprocates, engaging first one of the collars 57, 58 and then the other to reciprocate the shaft 37 and consequently the carriages 33 with their clamps 31 and consequently the wagon 14. The shaft
 130

37 is permitted to slide longitudinally through the pinion 39 (Figs. 4 and 5) by a spline connection. It will be seen that the lost motion of the slipper 54 between the collars 57 and 58 will cause some bump or jerk at each end of the stroke because the slipper moving in one direction will engage, for example, the collar 57, causing the wagon to move in one direction, and as the slipper 54 nears the end of its stroke in this direction it will slow up so that the wagon by its momentum will run ahead until the collar 58 engages the slipper 54, thus stopping the movement of the wagon with some bump or jerk. Likewise, there will be a similar bump or jerk at the other end of the stroke. Such bumps or jerks however, are not to be confused with heavier bumps or jerks which may be imparted to the wagon at either end of the strokes by mechanism to be described hereinafter. If desired, the pin 57^a holding the collar 57 may be placed in the hole 57^b, thus placing both the collars 57 and 58 close to the slipper, thus taking up all the lost motion so that the reciprocations can be given without any bumps or jerks at all at the ends.

The mechanism for imparting relatively heavier bumps or jerks to the wagon at either end of the strokes of reciprocation, comprises a pair of bumpers 59 and 60 (Fig. 4^a) carried by a pair of transverse horizontal channels 60^a, 60^b mounted between the I beams 11, 11. The shaft 37 extends through these bumpers. The two bumpers 59 and 60 are carried on a sleeve 59^a which is threaded in a supporting block 59^b and is adapted for rotation by means of a suitable sprocket wheel 61 adapted to be rotated, when desired by a chain 62 operated by a hand operated sprocket wheel not shown. By this construction, the two blocks 59 and 60 may together be moved longitudinally in one direction or the other. The shaft 37 also carries a collar 63 mounted near the bumper 60. The parts are so arranged that when the shaft 49 rotates in the direction indicated by the arrow in Fig. 7, that is, when the eccentric has its short throw in operation, neither of the collars 58 or 63 will engage either of the bumpers 59 or 60. When thus operating, the only bumping or jerking at the ends of the strokes of the reciprocation will be that caused by contact between the collars 57 and 58 with the slipper 54. These bumps or jerks are relatively light and may be entirely eliminated by adjusting the collar 57 endways towards the collar 58 so as to take up all slipping or lost motion of the slipper 54 between the said

collars. When reciprocating the wagon in this manner, the reciprocatory movement is preferably operated at fast speed. When it is desired to impart the relatively heavier bumps at one end only of the strokes of reciprocation, the pinion 43 (Figs. 3, 4 and 5) is used in order to give a slower speed, and the direction of rotation of the motor 41 is reversed in order to drive the eccentric 50 in the direction indicated by the arrow in Fig. 8 to give the long stroke. With the long stroke in operation, the bumpers 59 and 60 may be adjusted to one side or the other to cause either the collar 58 to engage the bumper 59 or the collar 63 to engage the bumper 60. When thus operating, the collars 57 and 58 are separated to permit of free movement of the slipper 54 between them. The parts are so adjusted and proportioned that the lost motion of the slipper 54 between the collars 57 and 58 permits sufficient overrunning of the shaft 37 to allow the bump to take place without causing the mechanism to lock. For example, with the bumpers 59 and 60 adjusted to the left, as viewed in Fig. 4^a, the slipper 54 will move to the right in contact with the collar 58 until the slipper slows down near the end of its stroke. The momentum of the wagon and associated parts however, will carry the collar 58 on beyond the end of the stroke of the slipper 54 until the said collar engages the bumper 59. The movement of the slipper 54 between the collars 57 and 58 permits this overrunning. When thus operating, the collar 63 does not engage the bumper 60. Similarly, when the bumpers 59 and 60 are adjusted to the right, as viewed in Fig. 4^a, the shaft 37 overruns the stroke of the slipper 54 at each movement to the left, so that the collar 63 strikes the bumper 60. When thus operating, the collar 58 clears the bumper 59. The collars 58 and 63 are so spaced that either one or the other will bump but not both, so that the bumps or jerks will occur at one end only of the strokes of reciprocation, the particular end at which such bumps occur depending upon the adjustment of the bumpers 59 and 60.

Any suitable means may be provided for opening the door of a side-door box or wagon preparatory to unloading. Such door opening mechanism, however, forms *per se* no part of the present invention. For the purpose of illustration, there is shown in Fig. 3, a strut 64 pivoted at its lower end to a bearing block 65 fixed to the ground and carrying at its free end a plate or ram 66. The strut 64 is adapted to be normally held in an upright

position by means of a counterweight 67 but may be lowered into the position shown by the broken lines in Fig. 3 to bring the plate 66 opposite the boards 68 such as are frequently placed on the inside of such a wagon to close the side door opening therein. It is understood, of course, that the sliding door on the outside of the wagon has previously been opened. When in the position shown by the broken lines, it will serve to force the boards 68 inwardly as the wagon is tilted and thereby uncover the opening and permit the loose material 69 to escape from the wagon.

Arranged in the central widened and deepened portion 18 of the pit 17 is a suitable hopper 70 and conveyor 71, such as a belt conveyor, which may be used to assist in catching and carrying away the loose material as it falls from the wagon.

In operation, the reciprocatory movement may be imparted to the wagon either with the platform 10 horizontal or tilted. In unloading a box car or wagon such as that shown with side doors, the unloading would be hastened by tilting the wagon. In unloading a wagon with a hopper bottom extending substantially the full width of the wagon, but not the entire length of the car, the tilting could be dispensed with. In unloading, the short stroke reciprocations without the heavier bumping against the bumpers 59 or 60, will cause the major part of the loose material to leave the wagon. Such reciprocations with the slipper 54 loosely or closely confined between the collars 57 and 58 will disturb the loose material sufficiently to cause it to seek its lowest level with the result that with such reciprocations alone, if continued a sufficient length of time, the wagon could be practically emptied. Even a side-door box or wagon, if loaded with fine grain or other material which "flows" readily, could be substantially emptied by merely reciprocating the same with no bumps at the ends of the strokes or only slight bumps or jerks (which could be the same at each end of the strokes) without tilting the car, if such reciprocations are continued a sufficient length of time. Material which "flows" readily such as wheat, for example, will continually seek its lowest level like water, as long as it is shaken, jarred, or disturbed in any manner. Consequently, even a side-door box car or wagon loaded with such material when in a horizontal position, if reciprocated, vibrated, bumped, jerked, or otherwise disturbed a sufficient length of time, would be substantially emptied of its entire contents. Such disturbing would naturally cause the contents to

seek the lowest level with the result that material would issue from the side-door openings until only a very thin layer remained on the floor of the wagon.

If desired, the longer stroke reciprocation can be imparted and the bumpers 59 and 60 adjusted so that there will be a heavier bump at one end of the strokes. This heavier bumping at one end of the strokes will cause the loose material to move bodily in the wagon in a direction toward the end at which such bumps occur. This, obviously, will result in causing the loose material at the opposite end of the wagon to move toward the centre where it will find an exit. After one end of the wagon has been emptied in this manner, the bumpers 59 and 60 can be oppositely adjusted to cause the bumps to occur at the other end and in like manner empty the other end of the wagon. By the use of such relatively heavier bumping at one end only of the strokes, the unloading can be hastened or made more complete.

Although particular means for reciprocating the car, bumping the same, tilting the platform, and performing the other operations of the apparatus have been shown, as well as particular forms of construction, it is to be understood, that, without detracting from the spirit and scope of this invention, other suitable means for performing such operations and other suitable forms of construction may be used.

Also, reciprocating mechanism substantially such as described may be used without any special platform, the wagon to be discharged, being supported upon a portion of an ordinary railway track adjacent to a hopper or chute, the wagon not being tilted otherwise, it may be, than by jacking up one side thereof a few inches on the springs.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. For discharging grain or other loose material from a wagon having a discharge opening through which, when open, the material can fall, apparatus comprising means for reciprocating, shaking or vibrating a wagon whereby the wagon is moved bodily in an endways or longitudinal direction.

2. Apparatus according to the preceding claim, wherein there is associated with means for supporting a wagon and the means used for reciprocating a wagon carried by the said supporting means, means for varying the lengths of the strokes of reciprocation.

3. Apparatus according to either of the preceding claims, wherein there is associated with the wagon supporting means and the wagon reciprocating means, a pair of clamps, adapted to hold a wagon between them and to be reciprocated by the reciprocating means.

4. Apparatus according to the preceding claims, wherein the clamps are connected to carriages mounted to reciprocate on the wagon supporting means and adapted to be drawn together to cause the clamps to hold a wagon between them on the said supporting means, the carriages with the clamps and wagon being arranged to be reciprocated together by the wagon reciprocating means.

5. Apparatus according to any of the preceding claims, wherein there is associated with the wagon supporting means and the means used for reciprocating a wagon carried thereby, means whereby the movement of the wagon at one end of the strokes of reciprocation, or at each end of the strokes of reciprocation, can be arrested suddenly.

6. Apparatus according to the preceding claim, wherein the means used for arresting the movements of the wagon at the ends of the strokes of reciprocation are adapted to admit of the movements of the wagon being arrested more suddenly at one end of the strokes of reciprocation than at the other end.

7. Apparatus according to Claim 6, wherein the means used for suddenly arresting the movements of the wagon are adapted suddenly to arrest the movements of the wagon for a period of time at one end of the strokes of reciprocation and then for a period of time at the other end of the strokes of reciprocation.

8. Apparatus according to any of the preceding claims, wherein the wagon supporting means is mounted to tilt sideways and means are provided whereby such supporting means with a wagon thereon, can be tilted sideways at will, the means used for reciprocating the wagon being capable of operation either when the wagon supporting means and wagon are in the normal upright position, or in the tilted position, substantially as described.

9. Apparatus according to the preceding claim, wherein the wagon supporting means is constituted by a platform mounted to turn sideways about a stationary longitudinal axis, substantially as described.

10. Apparatus according to any of the preceding claims, wherein the means used for clamping a wagon to be reciprocated, and the means used for reciprocating the wagon are operated by motive power carried by the wagon supporting means.

11. Apparatus according to any of the preceding claims, constructed, arranged and adapted to operate substantially as hereinbefore described with reference to and shown in the accompanying drawings.

12. The combination and arrangements of parts hereinbefore described with reference to the drawings and constituting apparatus for enabling wagons loaded with grain or other loose material to be rapidly and completely discharged.

Dated this 27th day of October, 1924.

For the Applicant,

LLOYD WISE & Co.,
10, New Court, Lincoln's Inn, London,
W.C. 2,
Chartered Patent Agents.

[This Drawing is a reproduction of the Original on a reduced scale]

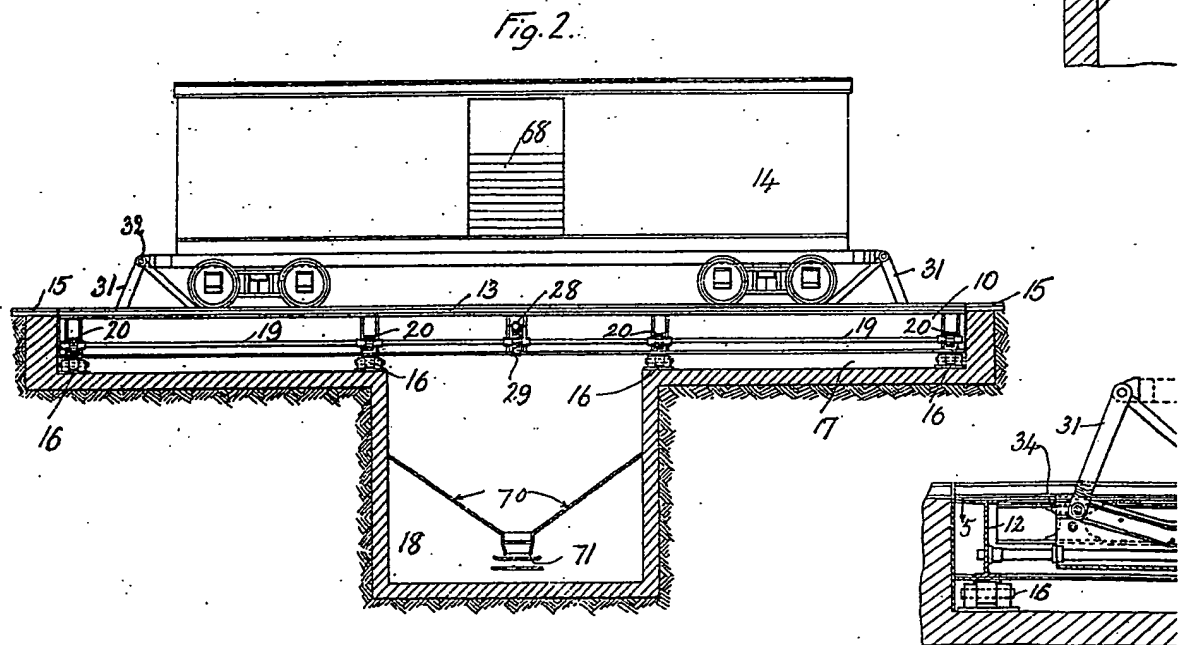
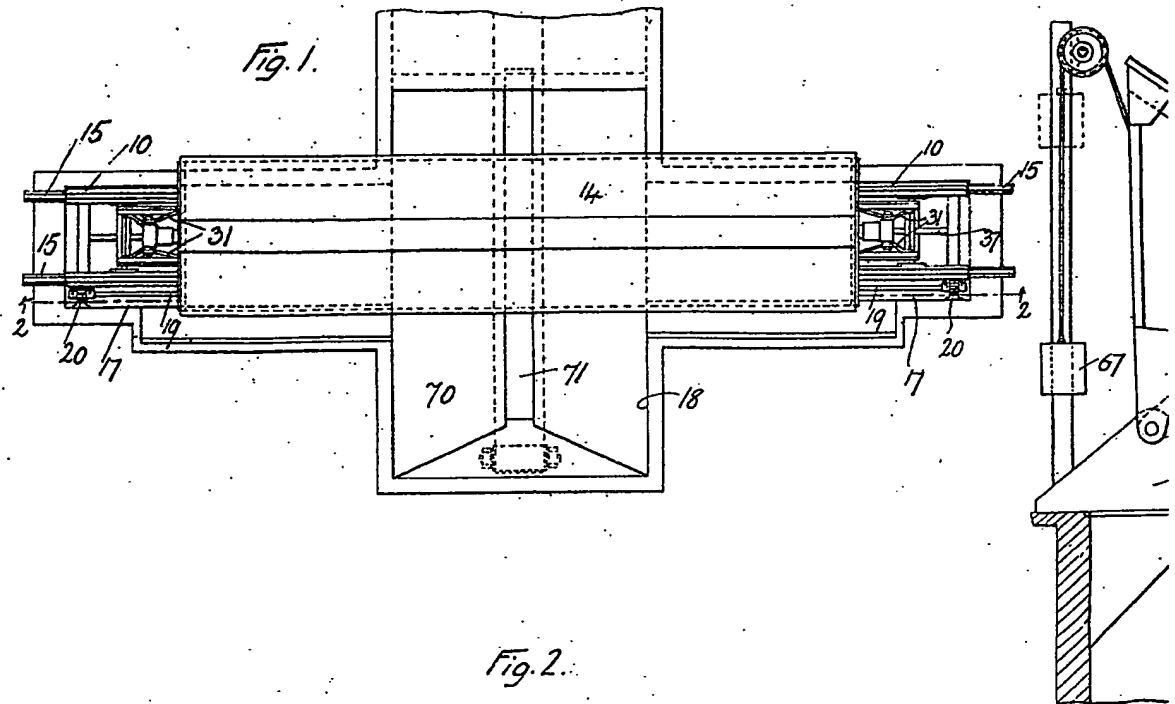


Fig. 3.

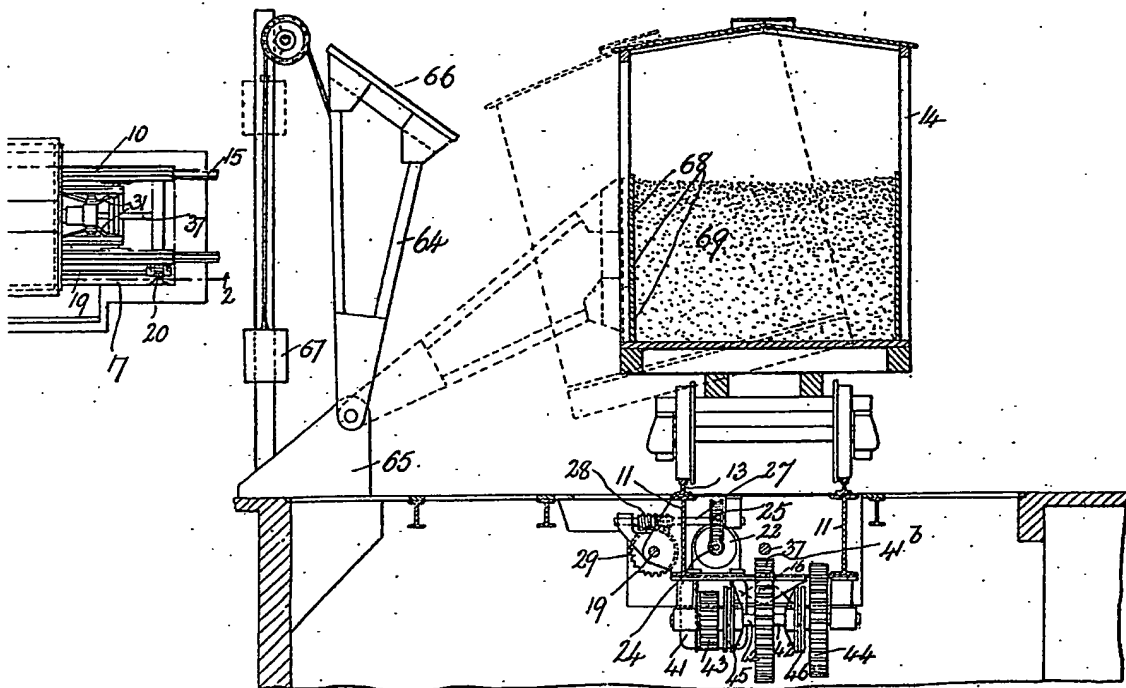
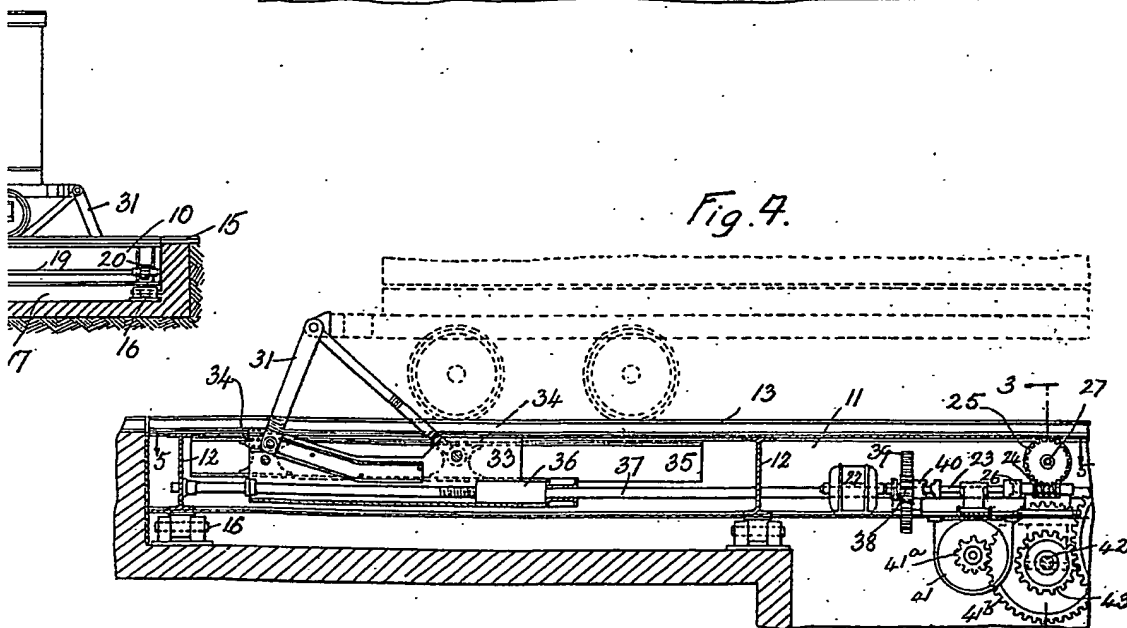


Fig. 4.



233,018 COMPLETE SPECIFICATION

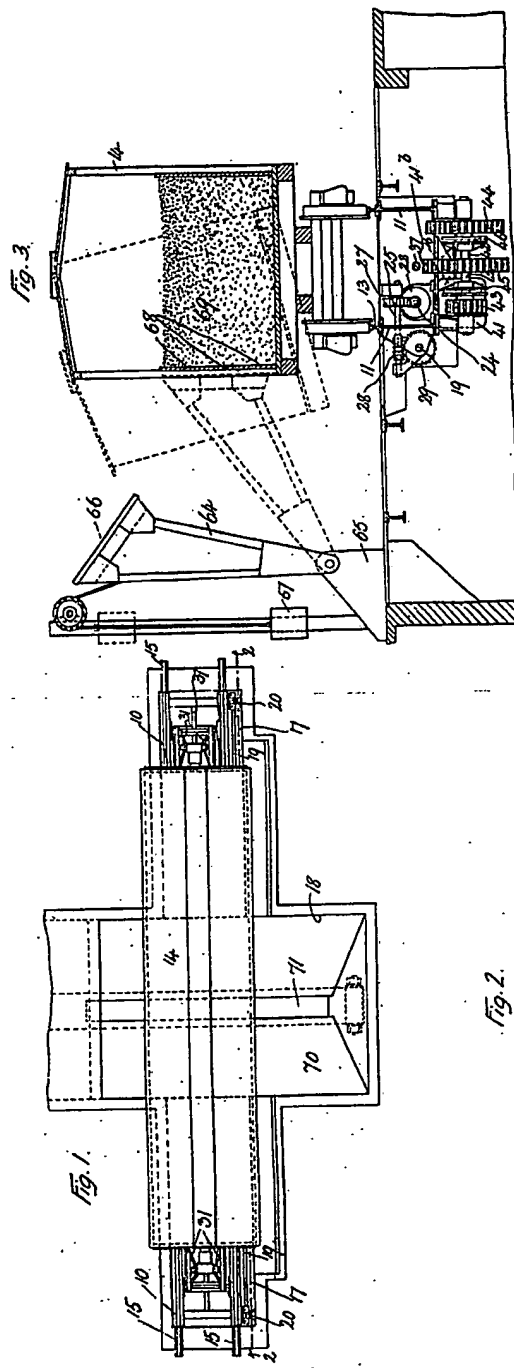


Fig. 2.

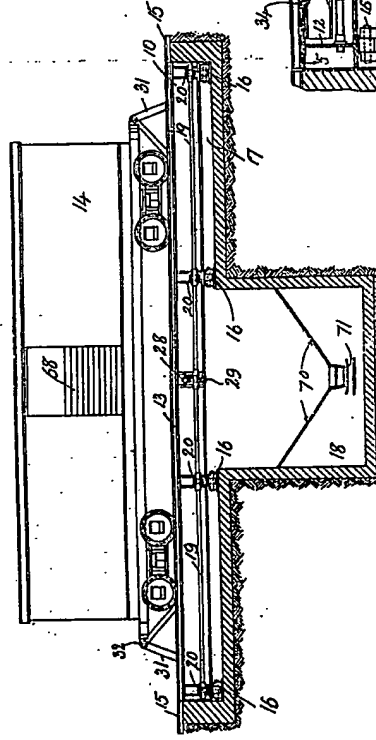
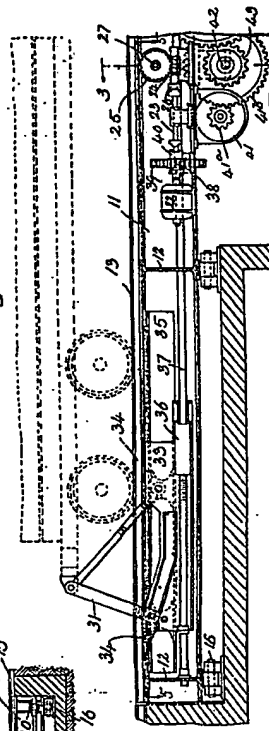


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale]

Fig. 4a

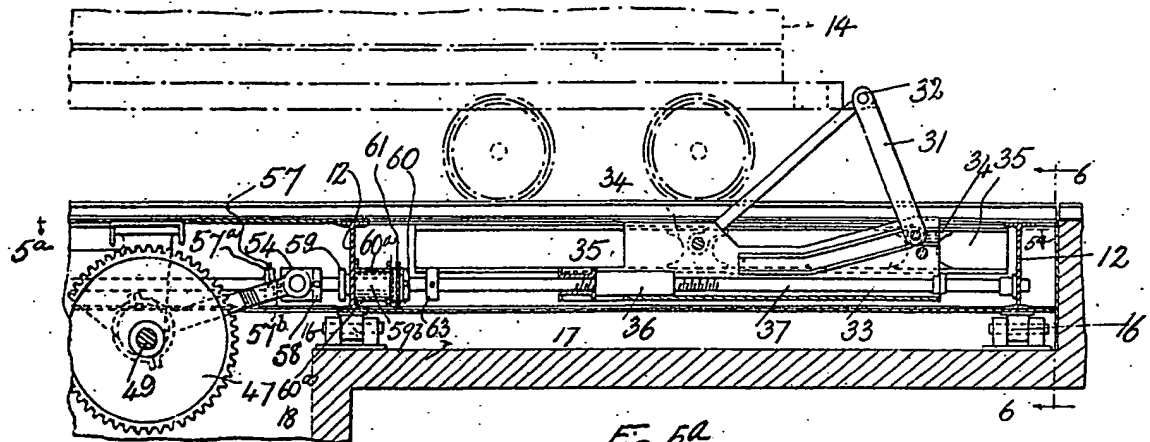


Fig. 5a

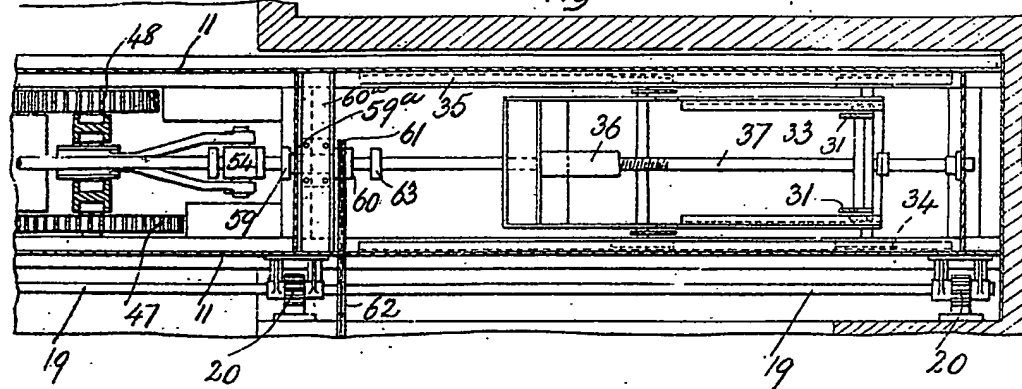
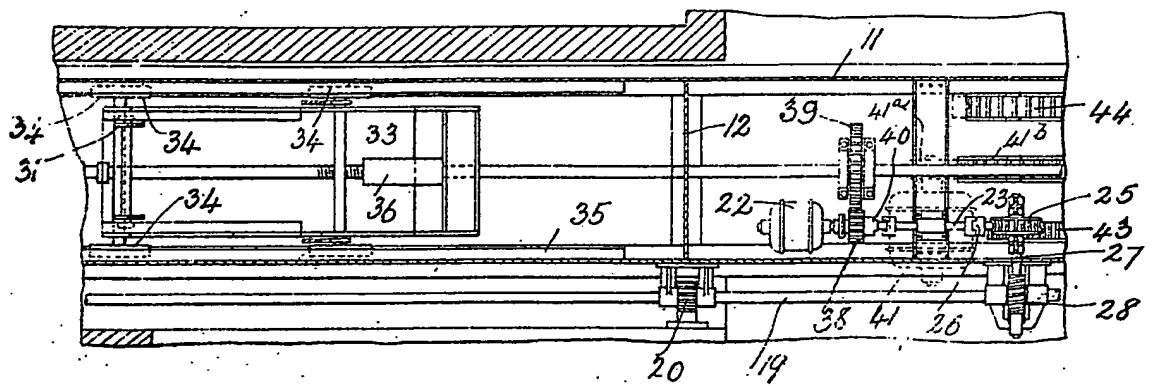


Fig. 5.



[This Drawing is a reproduction of the Original on a reduced scale]

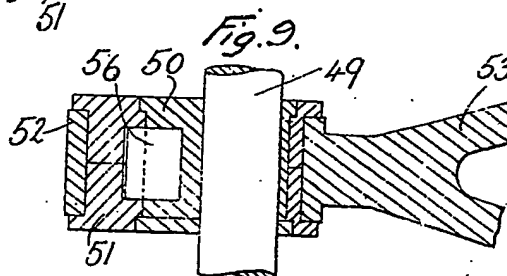
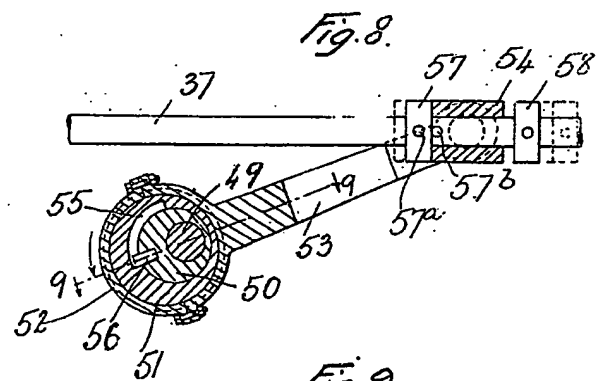
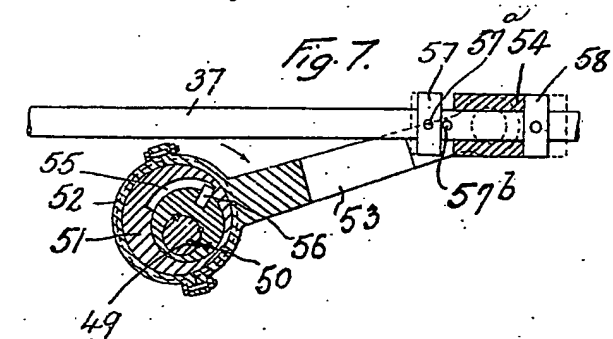
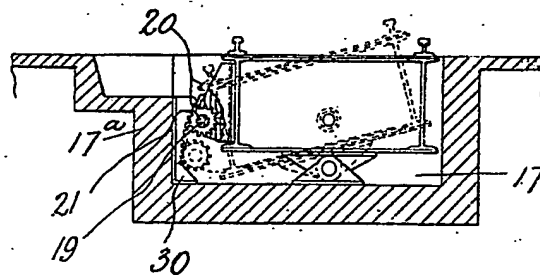
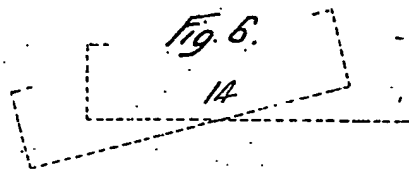
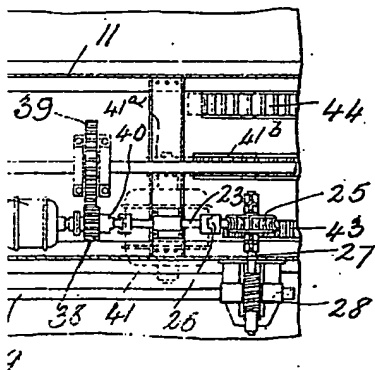
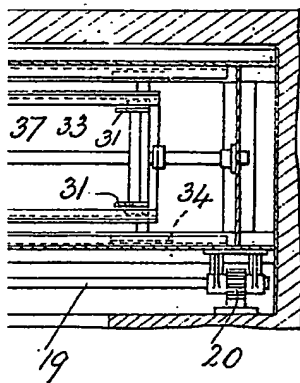
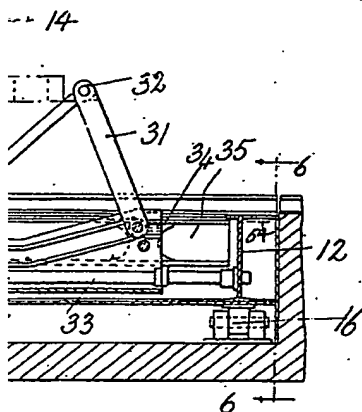


Fig. 4a

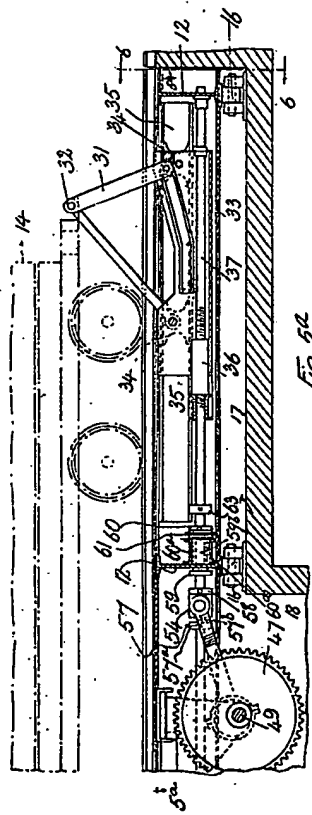


Fig. 5a

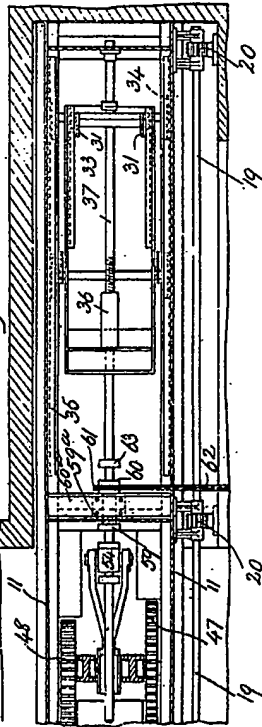


Fig. 5.

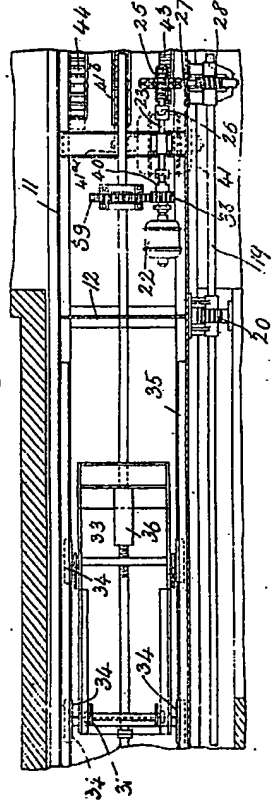


Fig. 6.

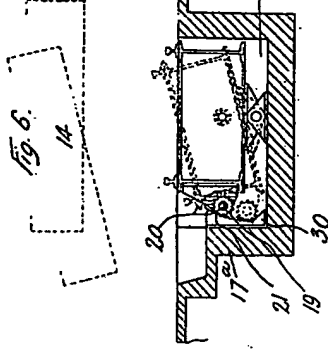


Fig. 7.

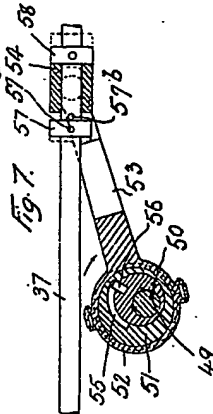


Fig. 8.

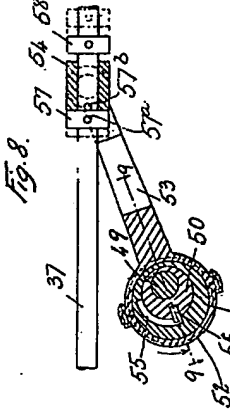
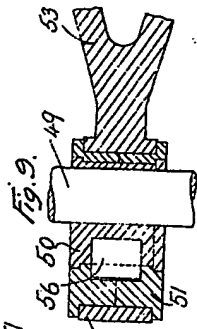


Fig. 9.



[This Drawing is a reproduction of the Original on a reduced scale]